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# Impact of the BBA on Post-Acute Utilization

Barbara Gage, Ph.D.

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*In this article, the author summarizes recent changes in Medicare post-acute payment policies, discusses the implications of certain design and implementation issues, and analyzes whether different types of patients are using skilled nursing facilities (SNFs), home health agencies (HHAs), and rehabilitation hospitals and units. If similar populations are treated by these three types of providers, service patterns may be affected by the financial incentives in the new, more restrictive payment policies. The author describes new post-acute care (PAC) payment policies, service patterns prior to the Balanced Budget Act of 1997 (BBA), differences in the populations using these providers, and possible effects of the new payment systems on site-of-care decisions.*

## INTRODUCTION

The 105th Congress passed the BBA and substantially altered the framework of the Medicare program. Besides adding new insurance options, the BBA mandated new payment systems that will nearly complete Medicare's shift from cost-based reimbursement to prospective payment systems (PPSs). (Refer to Moon, Gage, and Evans [1997] for a more complete summary of the changes in Medicare's fee-for-service and private plan payment policies.) Post-acute providers, including SNFs, HHAs, rehabilitation hospitals, hospital outpatient departments, and eventual-

ly long-term care (LTC) hospitals, will face more restricted payments as they move to a series of nationally standardized, case-mix-adjusted PPSs. Moreover, hospital transfer policies have been redefined to reduce a hospital's incentive to discharge patients to post-acute settings "quicker and sicker" (Guterman et al., 1988).

These new payment policies were intended to restrain provider cost-shifting out of the hospital, with its discharge-based payments, and into other settings with less restrictive payment policies. However, depending on how rates are set, these new policies may also affect how post-acute providers are used.

Medicare's coverage rules direct patients to certain settings based on their severity of illness, but the rules do not restrict patients from using less intensive settings that offer similar types of services. For example, patients who require inpatient levels of nursing and therapy care may be admitted to either rehabilitation facilities or SNFs. And although rehabilitation patients are required to have 3 hours a day of therapy services, Medicare does not restrict these patients from being treated in a SNF, which can also provide those services. Site-of-care decisions for home health patients are less ambiguous because these patients tend to be less severely ill and not qualify for inpatient services. Still, many home health patients, such as those who are ventilator-dependent, may have quite medically complex conditions and qualify for care in more than one setting.

All these patients are using post-acute facilities for nursing services; many are also receiving physical, speech, or occupa-

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tional therapy. Although the intensity of the average case may vary by setting, many post-acute patients could be treated at more than one site. This potential substitutability could become more important over the next few years as these providers move from traditional, cost-based reimbursement systems to separate and new types of PPSs. If the new payment rates vary across providers by more than the differences in provider costs or case complexity, these rates may influence site-of-care decisions.

Practice patterns may be further influenced by the staggered implementation timelines for each of the new post-acute PPSs. The BBA moved SNFs from cost-based payment systems to a PPS as of July 1998; HHAs, rehabilitation hospitals, and hospital outpatient departments are all scheduled to move to PPSs in 2000. The Secretary of Health and Human Services is also required to develop a PPS proposal for LTC hospitals by October 1999. In the interim, until the PPSs go into effect, home health care (HHC) and rehabilitation hospital payment methods have been modified to reduce payments for some of these providers.

The staggered implementation schedules for these new payment systems reflect differences in the "readiness" of the new payment methodologies. Final implementation may be postponed for one or more types of providers because of either difficulties completing the development of these systems in such a short time or resolving problems associated with setting up new administrative systems concurrent with year 2000 computer preparations. If these delays occur, they may have unintended consequences. Because each of these post-acute providers delivers primarily nursing and therapy services, providers will have an incentive to admit patients to the setting with the least restrictive payment policies. Despite case-mix adjustments to correct for

higher cost patients, providers that have moved to PPS will have a greater incentive to restrict services than those still being paid on a cost-reimbursement basis. If these facilities are treating similar types of patients, access to care may be greater in the settings that are still reimbursed their costs. If, however, these facilities are treating different types of patients, providers will be less able to offer substitute sites of care without adversely affecting outcomes or quality of care.

In this article, I describe the recent changes in Medicare's post-acute payment policies and present information on the types of patients using rehabilitation, SNF, and HHC services prior to the BBA. Understanding whether these patients differ is important for discussing the implications of the recent changes in Medicare's payment policies and their potential affect on access. Descriptive statistics and results from a multinomial logistic regression are used to contrast the types of populations using these three types of providers in 1995 (prior to the changes in payment policy). If similar populations are using this array of providers, then the new financial incentives may have an unintended impact on site-of-service decisions. If, on the other hand, patients differ in their medical needs or acuity levels, then other factors, such as quality of care, will be more important in determining the appropriate provider.

## **WHY THE NEW PAYMENT POLICIES?**

The BBA established PPSs for post-acute providers to rein in the extraordinary growth in Medicare spending for those services that was occurring over the previous decade. Changes in the SNF conditions of participation and in the coverage guidelines for both SNF and HHA services led to greater availability of these Medicare-

covered services. As a combined share of total Medicare expenditures, these two benefits grew from 6 to 15 percent of all Medicare spending between 1989 and 1996. The number of people using SNFs nearly doubled, from 638,000 to 1.1 million, increasing the number of Medicare-covered SNF days from 25.1 million to 40.2 million between 1990 and 1996. Similarly, the number of people using HHC nearly doubled between 1990 and 1996, from 1.9 million to 3.7 million; and the number of visits per user more than doubled during this period, from 36 to 77 visits a year.

Annual aggregate Medicare payments to SNFs and HHAs grew in double digits between 1990 and 1996, with 1-year increases as high as 56 percent for SNFs and 53 percent for HHC. Although the growth rates have been declining more recently, they are still substantially higher than the average growth rates for hospital or physician payments, which have ranged between 8 and 12 percent a year (Prospective Payment Assessment Commission, 1997).

In addition to changes in coverage policies and guidelines, treatment patterns for SNFs and HHC services also changed. Therapy charges became an increasingly important component in SNF care, growing from 15 to 29 percent of all Part A SNF charges between 1990 and 1996 (Prospective Payment Assessment Commission, 1996). This amount understates the actual growth because it excludes any charges for SNF ancillary services covered under the beneficiary's Part B insurance. In HHC, patients remained under care for longer episodes. The proportion of HHC episodes lasting longer than 165 days grew 43 percent, and these longer episodes contained a growing number of aide services (discussed later).

Rehabilitation hospitals also increased in importance during the 1990s. Medicare spending for services provided in these facilities doubled between 1990 and 1994, reaching \$3.9 billion in 1994. The growth in the number of users is almost as great, from 172,000 discharges in 1990 to 288,000 in 1996 (Prospective Payment Assessment Commission, 1997).

Much of this growth in post-acute spending may be attributable to a greater supply of services, which in turn, indirectly increased the demand for these types of care. The number of Medicare-participating SNFs rose from 10,508 in 1990 to 15,553 in 1996; HHAs nearly doubled in number, from 5,793 to 9,886; and the number of rehabilitation providers grew from 813 in 1990 to 1,048 in 1996 (Prospective Payment Assessment Commission, 1997).

Improvements in technology have also contributed to the growth in post-acute service use, allowing more complex services to be delivered in less intensive settings. These advances, coupled with changes in the financing systems, have led to the development of what some call a "sub-acute" industry in both the rehabilitation facilities and SNFs, which have helped expand the use of these types of providers. As this new market has grown, more therapists and post-acute providers have entered the market, making services even more available. Medicare's cost-based payment policies did not discourage this growth. Historically, rehabilitation hospitals, SNFs, and HHAs were paid on the basis of allowable costs, although the actual payment method varied by type of provider. None of the payment systems incorporated traditional indemnity cost-containment measures of either discounted prospective rates or utilization review methods, which would have limited the

price Medicare paid or the volume of services delivered. Hence, patients were discharged from hospitals that had payments restricted to an average cost per episode into a setting where payments for services were relatively unlimited. As hospitals became vertically integrated with other types of providers, the effects of these different payment methods became more pronounced. Although the shift to less intensive (and less expensive) sites of care was desired, PAC providers faced few restrictions on the volume of services or days they could deliver within the covered benefit.

## **NEW PAYMENT SYSTEMS FOR PAC**

Congress responded to the unrestricted growth in PAC payments by establishing new cost-containment systems for these services and changing the hospital payment policy for discharges to PAC providers. As of October 1998, if a hospital inpatient is treated for 1 of 10 specific diagnosis-related groups (DRGs) and then discharged to a non-PPS setting, the patient is considered a transfer patient. The hospital payment is reduced to the lower transfer payment amount in most of these cases (*Federal Register*, 1998).

The 10 DRGs affected by this transfer provision were chosen because they frequently involve discharge to post-acute settings or they represent a large number of post-acute admissions. These include DRGs 014, 113, 209, 210, 211, 236, 263, 264, 429, and 483. (A list of the DRGs mentioned in this article appears in the Technical Note.) The number of DRG groups in this policy may be expanded in October 2000.

In addition, PPSs are mandated for each of the post-acute providers by the year 2000. PPSs have the potential to transfer to the provider the financial risk for treating groups of patients. Payments are based on

the average costs for a unit of service, which can be adjusted by case-mix weights to reflect the difference in costs for different types of cases. These adjustments minimize provider incentives to avoid more costly cases and protect access to care for sicker patients.

Payment units may be a service, a day, an episode, or a year, although the latter is typically referred to as capitation. Larger units transfer more risk to the provider but give providers an incentive to limit services. This may reduce discretionary service use but also may create access problems.

Payments for Medicare's hospital PPS are discharge based, reflecting the average cost per stay of treating a patient in a certain DRG group. Total treatment costs for this level of care are fairly predictable. Alternatively, per diem payments are useful when total treatment costs are more variable. The rate is based on the average cost per day for a particular type of case instead of the entire treatment episode, and providers have no incentive to limit the number of days, particularly at the end of the episode, when costs become more discretionary. This lack of a volume control can be offset, however, by reclassifying the patient during the stay.

The legislation leaves the payment units up to the Secretary to decide. Although per diem payment methods are not as effective in controlling volume as a discharge-based payment, they limit the price paid for the service (or day) without giving the provider an incentive to restrict the number of days or length of stay. Regardless of the payment units chosen, using prospective rates will standardize the prices paid for these services and improve the predictability of payments for both providers and the Medicare program.

Moving payments from cost-based reimbursement to prospectively set rates provides a mechanism for controlling

Medicare's total payments. Because different services may move to PPSs in different years, providers that have access to more than one type of setting will have an incentive to discharge patients from PPS settings to cost-based settings to minimize their own costs or maximize their revenues.

### **Skilled Nursing Facility PPS**

The BBA moves SNF services into a PPS over a 3-year period for each facility, beginning in July 1998. SNFs will receive a case-mix-adjusted per diem payment based on a blend of national and facility-specific payment amounts. Beneficiaries will be classified into 1 of 44 resource utilization groups (RUGs). Each RUG has two weights—one each for nursing and ancillary costs. The weights will be applied to the national per diem rate to create case-mix-adjusted payments for SNF patients. Payment rates will be calculated separately for urban and rural areas. Including ancillary costs (particularly therapy) in the case-mix-adjusted payment is expected to constrain these payments to a nationally standardized level that reflects patient acuity. This is particularly important for constraining SNF expenditures, because much of the past growth in these expenditures was attributable to rising ancillary charges, which were not restricted to any cost limits prior to BBA.

Patient assignments to specific nursing and therapy classifications will be reassessed on a regular basis throughout the SNF stay. This will allow facilities higher payments during the more intensive part of the stay but reduce the payment level as the patient requires less intensive services. Although per diem payment does not give SNFs the same incentive to manage all services during the stay, it provides an incentive to manage services for each day of care. This also provides an incentive to treat sicker patients who require longer stays.

### **Home Health Care PPS**

Medicare's HHC payments move to a PPS by October 2000. These expenditures grew because of treatment patterns. In addition to a growing number of users, actual use levels rose from 23 visits per user to 77 visits per user between 1988 and 1996, reflecting longer episodes of care (Prospective Payment Assessment Commission, 1997). About 20 percent of all HHC episodes lasted at least 166 days in 1995, up from 14 percent in 1990 (Table 1). Longer episodes have a greater proportion of less intensive and less expensive aide visits, although these episodes also account for higher costs per patient. It is interesting to note that, despite the increasing number of longer term users, the service mix or intensity of an episode has not changed over time. For example, 61 percent of all services in short episodes (those lasting less than 31 days) were skilled nursing services in both 1990 and 1995. It is unclear, however, how much of the growth is attributable to previously unmet demand or to greater availability of services.

The BBA included several cost-containment strategies to limit the growth in HHC expenditures. First, an interim payment system (IPS) was established that reduced the previous aggregated per visit cost limits and established new per beneficiary average expenditure limits. This new criterion restricts agencies to their historical average expenditure levels updated for inflation, in an attempt to control the growth in expenses associated with the trend toward longer episodes.

The per visit cost limits were lowered from 112 percent of the mean cost for each type of visit to 105 percent of the median cost. These limits were modified in the Omnibus Consolidated and Emergency Supplemental Appropriations Act of 1999, which increased the per visit cost limits to

**Table 1**  
**Changes in Medicare Home Health Care Use: United States, 1990-1995**

Episode Length	Proportion of Episodes		Proportion of Visits			
			Skilled Nursing		Aides	
	1990	1995	1990	1995	1990	1995
1-30 Days	39	32	61	61	20	20
31-120 Days	43	42	51	49	29	30
121-165 Days	5	6	50	48	35	36
166 Days or More	14	20	45	44	46	46

SOURCE: Medicare home health claims, 1990 and 1995.

106 percent of the median cost and increased the average expenditure limit for certain agencies, particularly older agencies with limits below the national median.

The BBA also mandated that a PPS be established in the next few years. Payments will be case-mix adjusted to reflect the difference in cost between various types of patients and the average cost of an HHC patient. Payment rates will be based on a 15-percent reduction from what the cost limits would have been in 2000 without any changes in payment. These payments can be adjusted for certain outliers up to 5 percent of the total payments.

In addition to cost-containment strategies, the BBA also redistributed payments for the HHC benefit across both parts of the insurance program to reduce the strain on the Part A Hospital Insurance Trust Fund. HHC visits that are not related to an earlier 3-day hospital stay or that follow at least 100 visits subsequent to a stay will be financed from the Part B fund. These changes should be transparent to both the beneficiary and provider, because no change in benefit (such as a Part B copayment) or payment is attached to this provision.

The Secretary will define the payment unit, payment rates, and case-mix-adjustment system needed to establish these rates. The unit is expected to be an episode, because findings from HCFA's earlier research on prospective payments for HHC showed no real savings and no substantial changes in service use when agencies were paid on a prospective per

visit basis (Phillips et al., 1994). Agencies still had an incentive to increase volume to generate profits. Paying for an episode minimizes this incentive and instead creates the opposite incentive—to limit use in order to gain profits.

Agency payments will be case-mix adjusted to reflect differences in average patient costliness, reducing the provider incentive to restrict access for sicker, more expensive patients. The HHC demonstration used case-mix factors that measured prior hospitalization, differences in activity of daily living (ADL) limitations, and history of cancer, diabetes, stroke, or decubitus ulcers. However, these factors were not developed to measure relative differences in cost per case. Alternative case-mix measures are being developed through another study that may improve the predictive power of these models. These types of program details remain to be resolved before the national PPS is established.

### **Rehabilitation Hospital PPS**

Payments to rehabilitation facility providers have increased, on average, by 22 percent a year between 1986 and 1994 (Prospective Payment Assessment Commission, 1997). Much of this growth is attributable to the growing numbers of beneficiaries using these services and the rapidly growing number of providers. Because rehabilitation facilities are paid on the basis of facility-specific costs per discharge in a base period, newer providers have higher

base-year costs and therefore higher payment rates than older facilities. In addition, studies have shown that new facilities increase their costs in their base year relative to the immediately preceding year and then decrease them in the following year to maximize revenues (Chan et al., 1997). The BBA modified the base rates for new providers, paying the lesser of the new facility's operating costs or 110 percent of the 1996 national median target amount for similar types of facilities.

Rehabilitation hospitals are being phased into a PPS between October 1, 2000 and October 1, 2003. Moving these providers to a national case-mix-adjusted PPS should standardize the payments to reflect patient costliness.

Like the HHC PPS, many of the details for the rehabilitation hospital PPS remain to be resolved, including the appropriate unit of payment. Although rehabilitation hospitals have traditionally been paid on a discharge basis, a per diem payment unit was also being considered. This would give facilities an incentive to manage the cost of a day of care but would not reflect the variation in patient costs during the episode. However, if patients are reclassified during an episode, as in the SNF PPS, rates could be adjusted to reflect the higher cost per day at the beginning of the episode. This would minimize a provider's incentive to stint on services.

Another issue is deciding which case-mix measurement system is most appropriate for reflecting the varying costs of rehabilitation patients. One classification system, the functional independence measure-function-related groups (FIMS-FRGs) was developed to measure differences in functional levels among clinically similar patients in rehabilitation facilities (Stineman et al., 1997). Alternatively, the

Resource Utilization Group System, version III (RUGS-III) classification system (Fries et al., 1994), which is used to measure variation in nursing and therapy resource use in SNFs, is also being considered.

Using one measurement system across providers would allow contrasts of rehabilitation patients admitted to either rehabilitation facilities or SNFs. However, one recent study showed that RUGS-III was a poor predictor of resource use for rehabilitation patients, explaining only 11 percent of the variance for the rehabilitation facility cases compared with the 32 percent previously measured, using FIMS-FRGs with rehabilitation populations (Eilertsen et al., 1998). This is because of the low level of variation in resources used by rehabilitation patients. Similarly, the FIMS-FRGs system was a relatively poor predictor for SNF patients, where the relationship between therapy and function is less linear. Patients are admitted with lower functional levels and therapy use may not be related to length of stay. SNFs treat a wider range of patients than rehabilitation facilities with more cases having lower functional levels.

Another option is to combine these systems, using RUGS-III to measure nursing care and identify rehabilitation patients and the FIMS-FRGs to further classify rehabilitation patients. Although this may require modifying some measures to ensure that ADLs or other concepts are measured consistently, combining the two systems would allow patients to be classified on the basis of nursing and therapy needs independent of where the care was received. The final instrument could be used in both the SNF and rehabilitation settings, potentially improving case-mix measurement for both sets of patients, especially as SNFs provide more subacute care.

## SYSTEM INTERACTIONS

These payment policy changes were intended to restrain the growing post-acute costs of the 1990s without restricting beneficiary access to services. Each PPS will limit the growth in expenditures by giving providers the incentive to manage the costs associated with the unit of payment.

The staggered implementation schedules for the new payment systems will create new dynamics among providers in local markets as some remain on a limited cost-based reimbursement schedule. As HHAs continue to serve more medically complex patients, the incentive to transfer patients to the facility with the highest level of reimbursement will grow. Understanding patient needs and the extent of potential substitution is important for considering the unintended consequences of moving these providers into PPSs on varying timelines.

## HOW ARE PAC SERVICES USED?

Rehabilitation hospitals, SNFs, and HHAs each provide nursing and therapy services. Although Medicare's coverage guidelines clearly direct certain patients into specific settings, the distinction may be less clear for other patients.

Past research on whether PAC services are substitutes for each other has been inconclusive. One national study found that SNF services may be a substitute for a small proportion of home health services but that HHC does not substitute for SNF use (Kenney and Moon, 1994).

Several other recent studies have looked at the characteristics of patients using PAC services (Liu, Wissoker, and Rimes, 1998; Lee, Huber, and Stason, 1997; Kane et al.,

1996; Kramer et al., 1997; Eilertsen et al., 1998; Kramer, Shaughnessy, and Pettigrew, 1985) and found differences in the types of people using each service.

Understanding who uses each type of provider is important in ascertaining whether changes in the payment policies will create barriers for certain populations. In addition, if certain services are substituted for others, the new payment systems may affect the delivery system configuration but have only a limited impact on expenditure growth.

ProPAC (1996) began to look at the relative use of these services in 1994 to see whether there were differences in the types of patients treated in each setting. Their findings showed that patients with certain DRGs, such as 209, 210, and 014, were commonly discharged to all three settings, but hospital length of stay prior to post-acute admission differed by discharge and ranged for all DRGs between 11.2 days for rehabilitation hospital admissions to 9.6 days for HHC users. However, the study did not control for diagnoses or use of other post-acute services.

This study builds upon that work to analyze the factors that predict the use of one type of service over another after controlling for primary diagnosis in the hospital and related factors. If discharge destinations for certain DRGs differ after controlling for age, disability, hospital readmission, and other factors, this would suggest that health-related factors distinguish the types of post-acute services needed, and financial incentives will have less of an effect on destination. However, if the probability of using each service remains the same after controlling for these factors, then these settings may be interchangeable.

able and the financial incentives associated with the new payment policies may redirect patients to the highest paying facility appropriate for each type of patient.

## Data and Methods

The 1995 Medicare claims and denominator files for a 5-percent sample of beneficiaries are used to analyze how post-acute services were being used in the Medicare program prior to the BBA. This sample consists of beneficiaries who are at least 65 years of age and not enrolled in a managed care contract. (Because the sample is limited to elderly beneficiaries, disabled elderly could only be identified by whether they qualified for Medicare prior to reaching 65 years of age. Disabled beneficiaries who are not at least age 65 are not in this study.)

The first analysis I present provides national estimates of the number of elderly beneficiaries using short-stay, rehabilitation, and LTC hospitals, SNFs, and HHAs. These figures are presented as number of units per 1,000 beneficiaries to control for differences in the number of beneficiaries when comparing across States or services. Not all of these services are technically PAC. Because Medicare does not require acute hospitalization prior to using a rehabilitation hospital or home health services, and because managed care and subacute care treatment patterns are directing patients to these settings without a prior acute stay, patients may be admitted directly to either setting for services similar to those received following a hospital discharge. About 90 percent of all rehabilitation admissions and 58 percent of HHC admissions are post-acute cases, i.e., they were discharged from the hospital within the 32 days prior to post-acute use.

The second analysis constructs episode-level files to analyze the relative use of post-acute services for different groups of bene-

ficiaries. These analyses exclude end stage renal disease (ESRD) patients, because their cost and utilization patterns are significantly different from those of average elderly beneficiaries. Episodes are constructed by merging all Medicare claims for rehabilitation hospitals, SNFs, and HHAs with short-stay hospital claims to classify hospital discharges by whether they involved: (1) no PAC; (2) a rehabilitation hospital admission; (3) a SNF admission; (4) HHC services; or (5) a combination of these services within 32 days of discharge. All SNF, rehabilitation, and home health services following initial discharge from a short-stay hospital are included until a 32-day period without any services occurs.

Descriptive statistics are presented to illustrate the types of patients and their average cost and use levels across each of the different settings. A multivariate model is used to predict the probability of using one of the services or certain combinations of services. A multinomial logistic regression is used because it allows one to simultaneously predict the probabilities of each choice while controlling for individual characteristics (Maddala, 1992). The coefficients from the regression are used to calculate the probability of using each service for beneficiaries having each characteristic. In other words, the probabilities show the magnitude of the difference in the probability of using each service relative to other services and relative to other beneficiaries (those with the independent factor equal to one or zero).

## Descriptive Results

### Annual Utilization Levels

Nationally, almost 20 percent of the elderly beneficiaries in Medicare's fee-for-service program were hospitalized in 1995, and they used about 10 inpatient days per

**Table 2**  
**Regional Variation in Post-Acute Use per 1,000 Elderly Beneficiaries: United States, 1995**

Census Division	Short-Stay Hospital Days	Inpatient Rehabilitation Days	Skilled Nursing Facility Days	Home Health Visits
	Number per 1,000 Beneficiaries			
United States	1,789	146	1,231	6,997
New England	1,772	135	1,873	10,312
Middle Atlantic	2,403	181	1,179	4,162
South Atlantic	1,851	125	1,117	7,291
East North Central	1,871	151	1,465	5,039
East South Central	2,270	175	1,269	15,601
West North Central	1,621	112	1,364	4,066
West South Central	1,869	270	1,150	15,322
Mountain	1,099	110	992	5,120
Pacific	946	63	950	3,477

SOURCE: Medicare claims and enrollment files, 1995.

user per year. Less than 1 percent of aged beneficiaries used rehabilitation hospitals, although once admitted, they used about 18 days a year. SNF use was much more common, with almost 4 percent of all aged beneficiaries having an admission subsequent to a hospital stay. They stayed an average of 33 days per year. HHC is the most frequently used service, with almost 1 in 10 aged beneficiaries receiving an average of 73 visits a year.

Use of these services varies by geographic location (Table 2). This variation may be explained by differences in patient needs, local practice patterns, the supply of services, or other market factors, such as local managed care penetration or the role of the Medicaid program. Rehabilitation hospital use is greatest in the West South Central States (Arkansas, Louisiana, Oklahoma, Texas), which, along with the East South Central division, has extremely high HHC use. In fact, HHC use in these divisions is more than two times greater than the national average and 50 percent greater than that of New England, which has the third-highest HHC use rate. These higher utilization rates are offset by lower-than-average or average use of SNFs.

The Middle Atlantic States also have high use of rehabilitation hospitals but lower-than-average SNF and HHC use lev-

els. This suggests beneficiaries may be receiving rehabilitation services in place of SNF and home health services, because the high use of acute hospital days suggests that beneficiaries in these divisions are not healthier than average.

In contrast, the Pacific and Mountain divisions have lower-than-average utilization rates for acute hospitalizations and all three types of post-acute services. These areas have historically had lower utilization patterns. This may be because of their relatively high managed care penetration, which changed practice patterns. Alternatively, some other unmeasured factor, such as differences in the availability of these services, may explain the lower use levels.

#### Episode-Based Utilization Levels

Analyzing episodes of care allows examination of the mix of services used by an individual beneficiary. One in five beneficiaries was admitted to a hospital in 1995 and one-quarter of them continued into PAC after discharge (Table 3). Hospital users, in general, were more likely than the average beneficiary: (1) to be older (75 years or over), (2) to have been Medicaid recipients at some time during the year, (3) to have been disabled prior to reaching 65 years of age, or (4) to have died in 1995. Those who con-

**Table 3**  
**Proportion of Aged Beneficiaries, by Selected Characteristics: United States, 1995**

Characteristic	All Aged Beneficiaries	Aged Hospital Users	Aged PAC Discharges
		Percent	
All Aged Beneficiaries	100	20	5
Hospital Users	—	100	26
Age			
65-74 Years	54	43	32
75-84 Years	33	39	44
85 Years and Over	13	18	24
Female	59	59	65
Black	13	8	9
Medicaid/Medicare Dually Eligible	11	16	19
Disabled	7	10	10
Died in 1995	6	19	22

NOTE: PAC is post-acute care.

SOURCE: Medicare claims and enrollment files, 1995.

tinued on to PAC tended to be even older, with two-thirds of them being over age 75. Females, dually eligible beneficiaries, and previously disabled beneficiaries had greater representation in the post-acute population than in the general aged Medicare population. Almost one-quarter of all PAC users died in 1995, suggesting they are also a sicker population than hospital users or beneficiaries in general.

HHC is the most commonly used service, although beneficiaries may use more than one type of service following an acute hospital discharge (Table 4). More than one-half of all PAC users (51.3 percent) were discharged to an HHA and then sent home without other post-acute services for at least 32 days. Another 15 percent used HHC in combination with SNF care, and 5 percent

used it with inpatient rehabilitation services. Another 24.9 percent were discharged to a SNF but did not receive other services. Rehabilitation hospitals are the least frequently used providers, and often they are used in combination with HHC or SNF care.

A beneficiary's propensity to use PAC varies by medical condition. More than 40 percent of all PAC users had 1 of 10 primary diagnoses during the hospitalization immediately preceding post-acute use (Table 5). Some of these DRGs are very-high-volume conditions, with five of them (DRGs 014, 089, 127, 209, and 088) accounting for almost 20 percent of all hospital discharges. Further, certain DRGs (014, 209, and 210) had a very high proportion of patients using PAC following discharge from a hospital. For example,

**Table 4**  
**Percent of Hospital Discharges Using Selected Types of PAC Services: United States, 1995**

Service	All Hospital Discharges <sup>1</sup>	Users of PAC Services Only <sup>2</sup>
Hospital Only	62.0	NA
Hospital and Rehabilitation	0.9	2.5
Hospital and Skilled Nursing Facility	9.3	24.9
Hospital and Home Health Care	19.5	51.3
Hospital and 2 or More PAC Services	8.3	21.8

<sup>1</sup> N = 325,732.

<sup>2</sup> N = 124,088.

NOTES: PAC is post-acute care. NA is not applicable.

SOURCE: Medicare claims and enrollment files, 1995.

Table 5

## Percent of Elderly Hospital Discharges Using the Top 10 PAC Services, by Diagnosis-Related Group: United States, 1995

Diagnosis Related Group Number and Name	Number of Discharges	Percent Using Services					2 or More Services
		Any PAC Services	Rehabilitation Only	SNF Only	HHC Only		
014 Specific Cerebrovascular Disorders Except TIA	13,044	63.0	5.2	19.5	16.5	21.5	
089 Simple Pneumonia and Pleurisy, Age Over 17 Years	14,284	37.0	0.1	12.6	19.2	5.1	
127 Heart Failure and Shock	19,094	40.0	0.1	7.4	26.6	5.8	
209 Major Joint and Limb Reattachment Procedures of Lower Extremity	13,804	83.0	7.2	15.2	26.0	34.6	
210 Hip and Femur Procedures Except Major Joint, Age Over 17 Years, with CC	5,394	85.0	3.2	36.9	10.9	34.4	
088 Chronic Obstructive Pulmonary Disease	10,338	35.0	0.2	5.5	23.3	5.5	
079 Respiratory Infections and Inflammations, Age Over 17 Years, with CC	6,226	42.0	0.2	19.6	16.5	5.6	
296 Nutritional and Miscellaneous Metabolic Disorders, Age Over 17 Years, with CC	6,266	46.0	0.2	15.7	22.1	8.3	
148 Major Small and Large Bowel Procedures, with CC	5,122	48.0	0.3	9.0	29.4	9.4	
320 Kidney and Urinary Tract Infections, Age Over 17 Years, with CC	5,241	43.0	0.1	18.1	19.0	5.7	

NOTES: PAC is post-acute care. SNF is skilled nursing facility. HHC is home health care. TIA is transient ischemic attack. CC is complications and/or comorbidities. SOURCE: Medicare claims and enrollment files, 1995.

**Table 6**  
**Medicare Payments and PAC Days, by Discharge Destination: United States, 1995**

Discharge Destination	Total Medicare Payments	PAC Payments	PAC Days
Average Hospital Discharge	\$10,489	\$2,224	71
Hospital Only	6,611	0	0
Hospital and Rehabilitation	19,992	8,877	14
Hospital and SNF	15,183	5,698	38
Hospital and HHC	13,487	2,952	74
Hospital and 2 or More PAC Services	26,018	12,450	107

NOTES: PAC is post-acute care. SNF is skilled nursing facility. HHC is home health care.

SOURCE: Medicare claims and enrollment files, 1995.

almost 85 percent of hospital patients with DRGs 209 and 210 were discharged to post-acute providers in 1995.

The type of services used also varies by diagnosis. For example, although many patients in DRGs 209 and 210 were most likely to use a combination of services following hospital discharge (about 35 percent of each), DRG 209 patients were more likely to use home health services (26.0 percent), and DRG 210 patients tended to use SNF services more often (36.9 percent). Patients with these two diagnoses were among the most likely to use rehabilitation facilities. Patients in DRGs 127, 088, and 148, in contrast, were most likely to be discharged to home health services. DRGs 014, 089, 079, 296, and 320 had high proportions of patients discharged to both SNFs and HHAs.

Medicare program costs vary dramatically depending on the types of services used after the hospital discharge (Table 6). These per case payment differences may reflect disparities in the types of patients treated by each provider or in the average cost per day for each of the provider types. (Payments per case are based on final interim claims.) Beneficiaries who were discharged home without further services were the least expensive, costing the program, on average, \$6,611 per episode. Rehabilitation users were the most expensive, with episode costs almost twice as high as the average hospital discharge

(\$19,992 compared with \$10,489). Episodes including home health services lasted longer but generally were less expensive (\$13,487 per episode), unless coupled with other services.

One reason for the variation among settings could be differences in the types of patients using each provider. But even after controlling for primary diagnoses, the average cost per case varies according to which setting is used (Table 7). Again, this may be attributable to differences in the way services are provided in each setting or to differences in patient severity. If similar types of patients are using these settings, patient costs could be better managed by redirecting patients to the least costly setting.

Understanding whether costs per case vary because of the setting or differences in the types of patients using each setting is essential in analyzing the substitutability of these providers as the new payment systems go into place. Table 8 shows that patients discharged to rehabilitation settings tend to be younger, less likely to be disabled, female, or dually eligible. They are also generally healthier, with a smaller proportion dying than any other group of post-acute patients. (People who died during the year are included among each group of beneficiaries. Although this could have been used as an outcome, it also serves as a proxy for severity of illness during the year.) Rehabilitation facility users also are less likely to be readmitted to an acute hospital

**Table 7  
Medicare Use and PAC Payments, by Diagnosis-Related Group: United States, 1995**

Diagnosis Related Group Number and Name	Rehabilitation Only		SNF Only		HHC Only		Combination of Services	
	Number of Days	Cost per Episode	Number of Days	Cost per Episode	Number of Days	Cost per Episode	Number of Days	Cost per Episode
All DRGs	14	\$8,877	38	\$5,698	74	\$2,952	107	\$12,450
014 Specific Cerebrovascular Disorders Except TIA	18	11,559	43	6,592	76	3,338	118	19,320
089 Simple Pneumonia and Pleurisy, Age Over 17 Years	11	6,367	35	4,632	83	3,080	120	10,395
127 Heart Failure and Shock	16	10,981	36	5,238	88	3,194	129	11,242
209 Major Joint and Limb Reattachment Procedures of Lower Extremity	11	6,616	30	5,098	38	1,588	70	9,070
210 Hip and Femur Procedures Except Major Joint, Age Over 17 Years, with CC	17	9,856	45	6,765	67	3,290	101	13,283
088 Chronic Obstructive Pulmonary Disease	15	6,372	37	5,001	91	3,182	144	11,903
079 Respiratory Infections and Inflammations, Age Over 17 Years, with CC	12	8,339	37	5,607	99	4,364	129	11,848
296 Nutritional and Miscellaneous Metabolic Disorders, Age Over 17 Years, with CC	12	7,757	41	5,895	88	3,685	121	10,639
148 Major Small and Large Bowel Procedures, with CC	12	6,830	33	5,489	56	2,514	100	9,982
320 Kidney and Urinary Tract Infections, Age Over 17 Years, with CC	11	7,458	44	6,181	98	4,601	123	12,216

NOTES: PAC is post-acute care. SNF is skilled nursing facility. HHC is home health care. TIA is transient ischemic attack. CC is complications and/or comorbidities. SOURCE: Medicare claims and enrollment files, 1995.

**Table 8**  
**Characteristics of Hospital Discharges: United States, 1995**

Characteristic	No PAC	Rehabilitation Only	SNF Only	HHC Only	HHC + Rehabilitation or SNF	Rehabilitation + SNF or HHC + Rehabilitation + SNF
Sample Size	201,644	3,088	30,313	63,679	24,229	2,779
Age in Years	76	75	82	77	79	79
	Percent					
Disabled	10.0	7.8	8.3	10.9	9.2	9.5
Female	54.1	60.2	67.7	62.7	69.1	65.7
Black	7.7	6.9	7.1	10.6	7.0	7.3
Medicaid/Medicare Dually Eligible	14.6	8.8	27.0	16.8	14.3	15.3
Died in 1995	18.1	11.5	38.4	16.4	18.3	20.2
Hospital Readmission	11.0	12.0	21.2	26.1	41.6	52.8

NOTES: PAC is post-acute care. SNF is skilled nursing facility. HHC is home health care.

SOURCE: Medicare claims and enrollment files, 1995.

during their post-acute episode. Patients discharged to SNFs, on the other hand, are more likely to be very old (82 years on average), female, and dually eligible. About 38 percent of the SNF PAC users died in 1995, suggesting they are a sicker population. HHC users differ from the other two populations because they are more likely to have had a disability prior to reaching 65 years of age, be black, or be dually eligible, and less likely to die that year. More than one-fourth of all HHC users were readmitted to the hospital, however.

### Multivariate Analysis

A multinomial logit model was used to predict the probability that an aged beneficiary would use one of six groups of services following discharge from a short-stay hospital after controlling for primary diagnosis and other beneficiary characteristics. Service outcomes included: (1) rehabilitation only; (2) SNF only; (3) HHC only; (4) HHC plus either rehabilitation or SNF; or (5) rehabilitation and SNF or rehabilitation, SNF, and HHC. The reference group was no post-acute services within 32 days of discharge from the short-stay hospital.

Independent variables include beneficiary age; a dichotomous measure of whether the beneficiary qualified for Medicare cov-

erage prior to age 65 because of a disability; sex; whether the patient's race was black or not; and whether they had any Medicaid buy-in coverage during 1995. The model also controlled for whether the beneficiary died in 1995 or had a hospital readmission during the post-acute episode. The nine census divisions were used to identify beneficiary residence. They include New England, Middle Atlantic, South Atlantic, East North Central, East South Central, West North Central, West South Central, Mountain, and Pacific. The contrast division was New England. Nine DRGs identified the primary diagnosis of the hospital stay immediately before the post-acute use—DRGs 014, 089, 127, 209, 210, 211, 088, 079, and 296. All other cases were in the contrast category. (The individual States in each division and the DRG numbers with definitions are listed in the Technical Note).

### Regression Coefficients

Regression coefficients of variables that are statistically significant at the 0.01 level or less are presented to indicate the relationship between having one characteristic and the probability of being in one of the service groups relative to not using any PAC (Table 9). A positive (negative) coeffi-

cient denotes that beneficiaries having that characteristic are more (less) likely to be in the respective utilization category than in the reference category. For example, the negative coefficient for dual eligibility in the first panel, which predicts the probability of using only rehabilitation facilities, indicates that, after controlling for beneficiary characteristics and primary diagnosis, someone who had Medicaid coverage at least once in 1995 is less likely to use a rehabilitation facility than to be discharged home without any post-acute services. In other words, all else being equal, a beneficiary with dual coverage is more likely to be discharged home without PAC than to a rehabilitation facility following acute discharge. In contrast, these patients are more likely to be discharged to a SNF than to be sent home without any PAC.

Although the coefficients are useful for identifying significant factors that distinguish people using each service, they do not explain the magnitude of the difference in the probability of using each service.

### Predicted Probabilities

Predicted probabilities are calculated for each factor to profile the characteristics of those likely to use each service and to contrast the relative probability of different types of beneficiaries' using each service (or groups of services) after controlling for differences among users (Table 10). For example, the first panel presents the relative differences between the probabilities of using any PAC for a person 65 years of age and one 80 years of age. The person age 80 has a much higher probability of using PAC—more than 20 percentage points higher than the person age 65, who has an 81.7-percent probability of not using services, compared with a 59.3-percent probability for the older beneficiary. The two groups also differ in their likelihood of

using each type of service. Although the younger and older beneficiaries have an equal probability of using rehabilitation hospitals after controlling for prior disability, sex, race, dual eligibility, death during the year, hospital readmission, geographic location, and DRG, the person 80 years of age is almost five times more likely to use a SNF following hospital discharge and almost 10 percentage points more likely to use HHC following discharge than the person age 65.

Beneficiaries who were disabled prior to age 65 are also more likely to use PAC (42-percent probability) than those who were not disabled (35-percent probability of use), after controlling for the other factors. Although the disabled are only slightly more likely to use rehabilitation services than no services, after controlling for differences (less than 1 percentage point), they are almost 10 percent more likely to use SNF and 24 percent more likely to use HHC than not to use any services. But much of this may be explained by factors other than their disability, because they are only 2.3 percentage points more likely than non-disabled beneficiaries to use SNFs and 3.4 percentage points more likely to use HHC.

Sex differences exist after controlling for other factors, with females being more likely to use PAC than males. Further, black persons are more likely to use PAC than white persons and other populations. Having Medicaid coverage at least 1 month during the year almost doubles the likelihood of using SNF care (from 6.95 percent to 12.08 percent) but has no significant effect on one's probability of using HHC, all else being equal (Table 9).

Beneficiaries who died during the year are slightly less likely (1.6 percentage points) to use PAC than those who did not. Although this suggests the sickest populations died in the hospital prior to post-acute use, this variable also distinguishes among

Table 9

## Coefficients Predicting the Probability of Using PAC Services, by Selected Characteristics: United States, 1995

Characteristic	Rehabilitation Only	SNF Only	HHC Only	HHC + Either Rehabilitation or SNF	Rehabilitation + SNF or HHC, Rehabilitation, and SNF Combined
Intercept	-18.9634	-22.8232	-14.0046	-24.9976	-33.2788
Age	0.3497	0.4185	0.2928	0.5027	0.6433
Age Squared	-0.00222	-0.00202	-0.00163	-0.00278	-0.00369
Disabled	NS	0.3864	0.268	0.3445	0.3595
Female	0.165	0.3478	0.3056	0.5412	0.406
Black	NS	-0.1303	0.3461	0.1199	NS
Medicaid/Medicare Dually Eligible	-0.4115	0.5915	NS	-0.2128	NS
Died in 1995	-0.3551	0.6893	-0.3668	-0.3408	-0.3907
Hospital Readmission	0.676	0.8723	1.1844	2.2018	2.7198
<b>Census Division</b>					
Middle Atlantic	0.3928	-0.4488	-0.2932	-0.7453	-0.4139
South Atlantic	NS	-0.6217	-0.4045	-0.7204	-0.6482
East North Central	NS	-0.2036	-0.5746	-0.5883	NS
East South Central	NS	-0.731	-0.4672	-0.7952	-0.4939
West North Central	NS	NS	-0.7965	-0.4844	NS
West South Central	0.757	-0.4453	-0.4901	-0.3862	0.4436
Mountain	0.4872	-0.1267	-0.5996	-0.206	NS
Pacific	NS	NS	-0.444	NS	NS
<b>DRG Number and Name</b>					
014 Specific Cerebrovascular Disorders Except TIA	3.0594	1.4547	0.5124	1.7786	3.3143
089 Simple Pneumonia and Pleurisy, Age Over 17 Years	-1.4533	0.2114	NS	NS	-1.0697
127 Heart Failure and Shock	-1.1363	-0.2985	0.3174	-0.1421	-0.7844
209 Major Joint and Limb Reattachment Procedures of Lower Extremity	4.1294	2.5742	1.9175	3.6303	3.5839
210 Hip and Femur Procedures Except Major Joint, Age Over 17 Years, with CC	3.4756	2.8496	0.9161	3.2207	3.93
211 Hip and Femur Procedures Except Major Joint, Age Over 17 Years, Without CC	4.0163	2.9337	1.1865	3.3709	3.8943
088 Chronic Obstructive Pulmonary Disease	-0.8531	-0.1989	0.2336	NS	-0.6872
079 Respiratory Infections and Inflammations, Age Over 17 Years, with CC	-0.8293	0.5865	NS	NS	-1.1848
296 Nutritional and Miscellaneous Metabolic Disorders, Age Over 17 Years, with CC	NS	0.5432	0.2784	0.4391	NS

NOTES: PAC is post-acute care. SNF is skilled nursing facility. HHC is home health care. NS is not statistically significant at the 0.01 level. DRG is diagnosis-related group. TIA is transient ischemic attack. CC is complications and/or comorbidities.

SOURCE: Medicare claims and enrollment files, 1995.

Table 10

Predicted Probability of Each Type of Elderly Beneficiary to Use PAC Services, by Selected Characteristics: United States, 1995

Characteristic	No PAC	Rehabilitation Only	SNF Only	HHC Only	HHC + Either Rehabilitation or SNF	Rehabilitation + SNF or HHC, Rehabilitation, and SNF Combined
Intercept	64.48	0.55	7.61	21.35	5.60	0.41
Age = 65	81.70	0.50	2.10	13.50	2.10	0.10
Age = 80	59.30	0.50	10.00	22.90	6.80	0.50
Disabled	57.99	0.50	9.70	24.44	6.87	0.51
Not Disabled	65.17	0.56	7.40	21.01	5.47	0.40
Female	61.03	0.56	8.34	22.97	6.65	0.46
Male	68.97	0.53	6.65	19.12	4.38	0.34
Black	59.78	0.58	6.26	27.21	5.80	0.37
Not Black	64.85	0.55	7.74	20.88	5.58	0.41
Medicaid/Medicare Dually Eligible	62.28	0.38	12.08	20.38	4.52	0.36
Not Medicaid/Medicare Dually Eligible	64.75	0.59	6.95	21.48	5.82	0.42
Died in 1995	65.40	0.42	13.44	16.12	4.32	0.30
Alive in 1995	63.79	0.58	6.58	22.69	5.92	0.43
Hospital Readmission	36.63	0.55	8.88	32.21	19.56	2.18
No Hospital Readmission	69.40	0.53	7.03	18.67	4.10	0.27
<b>Census Division</b>						
New England	53.96	0.37	9.08	28.21	7.95	0.43
Middle Atlantic	63.19	0.64	6.79	24.63	4.42	0.33
South Atlantic	65.73	0.43	5.94	22.92	4.71	0.27
East North Central	65.40	0.60	8.98	19.24	5.35	0.43
East South Central	67.23	0.51	5.45	22.02	4.47	0.32
West North Central	66.42	0.46	10.96	15.65	6.03	0.47
West South Central	64.30	0.94	6.94	20.59	6.43	0.79
Mountain	63.46	0.71	9.41	18.21	7.60	0.60
Pacific	60.13	0.38	9.60	20.16	9.26	0.46
<b>DRG Number and Name</b>						
014 Specific Cerebrovascular Disorders Except TIA	39.23	5.90	15.69	18.62	15.14	5.43
089 Simple Pneumonia and Pleurisy, Age Over 17 Years	67.66	0.11	7.81	20.34	3.96	0.12
127 Heart Failure and Shock	65.75	0.15	4.56	25.67	3.72	0.15
209 Major Joint and Limb Reattachment Procedures of Lower Extremity	13.82	6.06	16.93	26.72	33.97	2.50
210 Hip and Femur Procedures Except Major Joint, Age Over 17 Years, with CC	18.38	4.19	29.67	13.06	30.00	4.71
211 Hip and Femur Procedures Except Major Joint, Age Over 17 Years, Without CC	16.07	6.29	28.22	14.96	30.49	3.97

See notes at end of table.

Table 10—Continued

Predicted Probability of Each Type of Elderly Beneficiary to Use PAC Services, by Selected Characteristics: United States, 1995

Characteristic	No PAC	Rehabilitation Only	SNF Only	HHC Only	HHC + Either Rehabilitation or SNF	Rehabilitation + SNF or HHC, Rehabilitation, and SNF Combined
088 Chronic Obstructive Pulmonary Disease	66.42	0.20	5.09	23.85	4.27	0.17
079 Respiratory Infections and Inflammations, Age Over 17 Years, with CC	66.09	0.20	11.10	18.12	4.39	0.10
296 Nutritional and Miscellaneous Metabolic Disorders, Age Over 17 Years, with CC	60.78	0.25	9.77	22.83	6.15	0.23
Not Above DRGs	68.73	0.48	6.42	19.54	4.48	0.35

NOTES: PAC is post-acute care. SNF is skilled nursing facility. HHC is home health care. DRG is diagnosis-related group. TIA is transient ischemic attack. CC is complications and/or comorbidities. Probabilities are multiplied by 100 for presentation as percentages.

SOURCE: Medicare claims and enrollment files, 1995.

sicker PAC populations. SNF patients were 6.9 percentage points more likely to have died in 1995 than not to have died that year, suggesting they were sicker on average. The opposite pattern holds for HHC users, who were almost 7 percentage points less likely to have died in 1995. People who are readmitted are generally sicker, being almost twice as likely to use HHC and five times more likely to use a combination of services than those not readmitted. Beneficiaries in the New England division are much more likely to use PAC, all else being equal.

Patient diagnosis becomes a less important predictor of site of care after controlling for beneficiary characteristics and severity of illness. Patients in each of the DRGs studied are most likely to use HHC after controlling for differences in the patient demographic and health characteristics. However, the use of other services differs by DRG. Patients with DRGs 014, 209, 210, and 211, who typically need therapy services, are the most likely to use rehabilitation hospitals. Patients in DRG 209 are most likely to use HHC with other services or alone, and DRG 210 and 211 patients are more likely to use SNF or HHC in addition to rehabilitation or SNF. Patients with DRGs 089, 127, 088, 079, and 296 are much less likely to use PAC—only one in three cases. These patients have a very low probability of using rehabilitation hospitals but are more likely to use HHC following hospital discharge.

### Changes in Probability

Although these factors demonstrate differences in the propensity to use services according to the type of patient, it is also helpful to understand whether the probability of using services changes for each DRG after controlling for individual health-

related factors. If this is so, then financial incentives are less likely to affect discharge destination relative to medical need. If, on the other hand, beneficiaries have similar probabilities of using services regardless of whether these health-related factors are controlled, then severity of illness may have less of an impact on determining post-acute destinations. These effects may vary by DRG.

Patients with DRGs 014, 209, and 210 are still the most likely types to use PAC, although the probability of use changes slightly from the bivariate analysis presented in Table 5. Patients with DRGs 014 and 210 are about 3 percentage points less likely to use PAC (60.7 percent, compared with 63.0 percent, and 81.6 percent, compared with 85.0 percent) after controlling for differences in age, sex, dual eligibility, prior disability, and hospital readmission. Patients in DRG 209, on the other hand, are 3.2 percentage points more likely to use PAC.

Patients in DRG 014, who were most likely to use more than one service in both analyses, were next-most-likely to use SNF services in the bivariate comparisons but had a greater probability of using HHC, after controlling for individual characteristics. For example, DRG 014 patients are 2.9 percentage points more likely to use only HHC than to use only SNF, all else being equal (18.6-percent probability, compared with 15.7 percent). The change in the relative likelihood of using each service after controlling for age, prior disability, hospital readmission, and other factors suggests that there are differences in patient acuity that originally directed patients in DRG 014 into one setting rather than another. This would suggest that, all else being equal, changes in payment policies are less likely to result in site substitutions for these patients because different types of stroke patients are being treated in these settings.

Patients in DRG 210 also differ in their relative use of services after controlling for these other factors. The proportion using PAC declines slightly from 85.0 percent to 81.6 percent. And the most frequently used service changes from SNF only (used by 36.9 percent of the patients in DRG 210) to a combination of two or more post-acute services (34.7 percent). Patients in DRG 079 have similar changes in utilization patterns after controlling for death, hospital readmission, and other factors, showing they are most likely to use home HHC only instead of a SNF, all else being equal.

These changes in discharge destination after controlling for patient characteristics do not occur with the other DRGs studied, however. The relative likelihood of using each service after controlling for DRG remains similar, regardless of whether severity, disability, and geographic location are controlled. Patients with DRGs 089, 127, 088, and 296 are most likely to use HHC only, all else being equal. Patients with DRG 209 are most likely to use HHC with either rehabilitation or SNF services, but, as in the bivariate comparisons, they are next most likely to use HHC (9.8 percentage points more) than SNF, all else being equal. After controlling for DRGs, it is apparent that these other factors do not significantly affect the post-acute destination decisions for these types of patients. This in turn suggests a greater potential for site-of-care substitution for patients discharged with these primary diagnoses, although other omitted factors, such as living arrangements, may also affect the final decision.

## CONCLUSION

These findings support earlier studies that patients using rehabilitation services, SNFs, or HHAs, or going directly home without any post-discharge services differ

from each other. The findings also indicate that, for certain DRGs, site-of-care decisions are significantly affected by severity of illness. However, for other common post-acute DRGs, such decisions are not altered by probability of death, having a hospital readmission during the post-acute episode, having a disability earlier in life, or geographic location. This latter group that is not affected by severity of illness may be subjected to more discretionary placement decisions. Providers with an incentive to maximize revenues will be more likely to direct patients to the setting with the highest reimbursement levels. Current differences in Medicare payments relative to costs may be exaggerated, as SNF payments become prospectively set, case-mix-adjusted payments, while rehabilitation facility and HHC providers continue receiving cost-based reimbursements.

This study shows that the potential for substitution varies by type of DRG. Medical need, as measured by age, prior disability, hospital readmission, and other factors, was a significant predictor of the types of services used by patients in DRG 014 (who represent the largest group of PAC users), DRGs 210 and 079, changing their relative probabilities of using each service. These groups will be less likely to have financial factors, such as relative payments, affect their site-of-care decisions. Conversely, the relative probability of being discharged to each setting did not change for patients in DRGs 089, 127, 088, 296, and 209. This suggests that substitution among settings could occur more easily for non-medical reasons.

Changes in the payment policies for these services could provide the incentive to alter treatment patterns for patients discharged from acute inpatient settings. The hospital transfer provision in the BBA will minimize hospital incentives to transfer patients to other settings, but once this

decision has been made, factors other than medical need may determine the appropriate site of care.

This will have implications for Medicare's future expenditures. The new payment systems for rehabilitation and HHAs will follow the implementation of a SNF PPS. Hospitals that have contractual relationships with other facilities will have an incentive to discharge patients to rehabilitation facilities instead of SNFs until the rehabilitation PPS goes into effect. This may particularly affect patients with a primary diagnosis in DRGs 209, 014, or 210, because these patients have historically had a high proportion of discharges to rehabilitation facilities. Although this may not harm the quality of care, rehabilitation facilities may not be the most cost-effective setting for treating all the patients shifted there. Of more concern might be the patients who are shifted from SNF to a HHC provider because of payment incentives.

It will be important to monitor changing treatment patterns for all post-acute patients over the next few years. These concerns may be minimized once all three types of providers have been switched to PPSs, although this will depend on the relative generosity of each new payment system.

The new payment policies have the potential to restrain the growth rates in post-acute expenditures. The new hospital transfer policies allow Medicare to share in the provider savings achieved by transferring patients to less expensive settings, and the new policies for rehabilitation hos-

pitals and SNFs will limit program costs for these facilities. Folding ancillary costs into the case-mix-adjusted SNF PPS rates will reduce the provider incentives to increase therapy services as was occurring during the early 1990s. Instead, establishing a SNF PPS may limit the growth in subacute care and create greater distinctions between SNF and rehabilitation facility patients. In fact, to the degree that subacute units are treating patients that otherwise would be admitted to a rehabilitation facility, SNFs will have an incentive to become certified as rehabilitation facilities, at least until the rehabilitation PPS goes into effect.

Each PPS will introduce case-mix-adjusted payment rates, and these should protect beneficiary access to services if the rates reflect the underlying cost variations. If rates are fairly set to reflect the average cost per unit, providers will have an incentive to admit even the sickest patients. The post-acute payment policy changes included in the BBA are an intricate weaving that will make an important contribution to improving Medicare's payment policies.

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**TECHNICAL NOTE**  
**Definitions of Diagnosis-Related Groups**

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- 014 Specific cerebrovascular disorders except transient ischemic attack.
- 079 Respiratory infections and inflammations, age over 17 years, with CC.
- 088 Chronic obstructive pulmonary disease.
- 089 Simple pneumonia and pleurisy, age over 17 years.
- 113 Amputation for circulatory system disorders except for upper limb and toe.
- 127 Heart failure and shock.
- 148 Major small and large bowel procedures, with CC.
- 209 Major joint and limb reattachment procedures of lower extremity.
- 210 Hip and femur procedures except major joint, age over 17 years, with CC.
- 211 Hip and femur procedures except major joint, age over 17 years, without CC.
- 236 Fractures of hip and pelvis.
- 263 Other circulatory diagnosis, without CC.
- 264 Congenital heart disease, age over 9 years.
- 296 Nutritional and miscellaneous metabolic disorders, age over 17 years, with CC.
- 320 Kidney and urinary tract infections, age over 17 years, with CC.
- 429 Organic disturbances and mental retardation.
- 483 Tracheostomy except for face, mouth, and neck diagnosis.

Census Divisions and States:

**Division 1: New England**

Maine  
New Hampshire  
Vermont  
Massachusetts  
Rhode Island  
Connecticut

**Division 2: Middle Atlantic**

New York  
New Jersey  
Pennsylvania

**Division 3: East North Central**

Ohio  
Indiana  
Illinois  
Michigan  
Wisconsin

**Division 4: West North Central**

Minnesota  
Iowa  
Missouri  
North Dakota  
South Dakota  
Nebraska  
Kansas

**Division 5: South Atlantic**

Delaware  
Maryland  
District of Columbia  
Virginia  
West Virginia  
North Carolina  
South Carolina  
Georgia  
Florida

**Division 6: East South Central**

Kentucky  
Tennessee  
Alabama  
Mississippi

**Division 7: West South Central**

Arkansas  
Louisiana  
Oklahoma  
Texas

**Division 8: Mountain**

Montana  
Idaho  
Wyoming  
Colorado  
New Mexico  
Arizona  
Utah  
Nevada

**Division 9: Pacific**

Washington  
Oregon  
California  
Alaska  
Hawaii

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Reprint Requests: Barbara Gage, Ph.D., The Urban Institute, 2100 M Street NW, Washington, DC 20037.